

20/542, 022

Examiner's Notes



6,171,393  
6,270,575  
6,179,910  
6,315,827

- S (single, or none) (10a) (crystal #)  
S (Si or silicon)  
S (dip? or lower?) (10a) (seed (a) crystal #)  
S (axial or axial (8a) direction)  
S (<110>) (10a) (crystal (aa) orientation)  
S (inclined?) (8a) (crystal (4a) orientat?)  
S (CZ or ~~chiral~~ chiral (Sk))

10.3 Reg

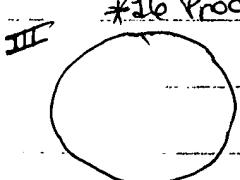
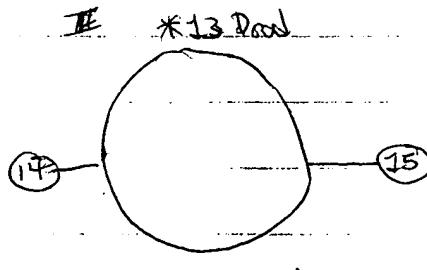
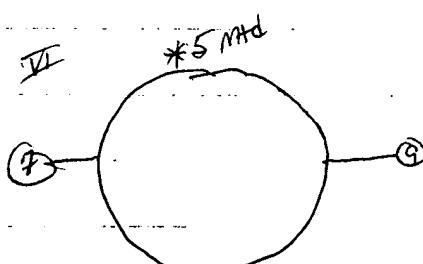
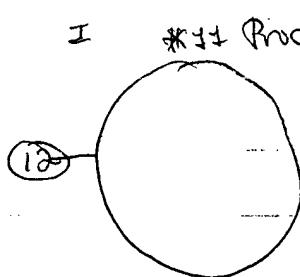
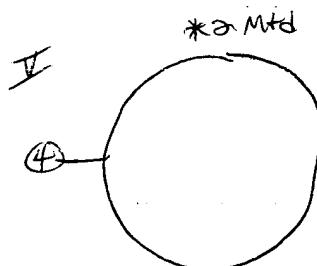
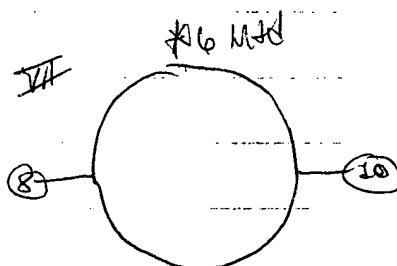
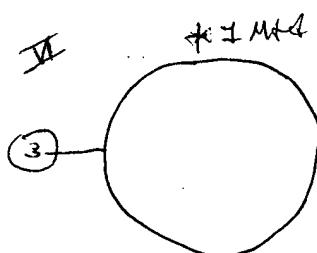
Claims I, 3 to 11 - 14 & 16

Allowable Subj Matter:

Claims 264-10

Object to:

Claims 15



=> d 18 1-4 abs,bib

STN  
~~(HCAPLUS, USPATFULL, HPC, JAPAN, IMPACT)~~  
8/3/2006

L8 ANSWER 1 OF 4 HCAPLUS COPYRIGHT 2006 ACS on STN  
AB A method for eliminating slip dislocation when a single crystal Si is produced, a seed crystal for eliminating slip dislocation, a single crystal Si ingot from which slip dislocation is eliminated, and a single crystal Si wafer are disclosed. A single crystal Si is produced by dipping a seed crystal in a melt and pulling the seed crystal up along the axis of the seed crystal, using a single crystal such that the <110> crystal orientation is inclined at a predetd. angle with respect to the axial direction in such a way that the direction of the edge of the {111} crystal face is inclined with respect to the axial direction. When a single crystal Si is grown while pulling up a seed crystal by the CZ method, a single crystal Si ingot of a large diameter and a heavy weight can be pulled up by eliminating slip dislocation from the thick crystal.

AN 2003:856110 HCAPLUS

DN 139:330639

TI Single crystal silicon producing method,  
single crystal silicon wafer producing method,  
seed crystal for producing single crystal  
silicon, single crystal silicon  
ingot, and single crystal silicon wafer

IN Iida, Tetsuhiro; Shiraishi, Yutaka; Suewaka, Ryota; Tomioka, Junsuke

PA Komatsu Denshi Kinzoku Kabushiki Kaisha, Japan

SO PCT Int. Appl., 33 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003089697	A1	20031030	WO 2003-JP4868	20030417
	W: KR, SG, US RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR				
	JP 2003313089	A2	20031106	JP 2002-118281	20020419
	EP 1498516	A1	20050119	EP 2003-717609	20030417
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, SK				
	US 2005229840	A1	20051020	US 2004-512022	20041019
PRAI	JP 2002-118281	A	20020419		
	WO 2003-JP4868	W	20030417		

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L8 ANSWER 2 OF 4 USPATFULL on STN

AB A method for eliminating slip dislocations in producing single crystal silicon, a seed crystal capable of eliminating the slip dislocations, a single crystal silicon ingot from which the slip dislocations have been eliminated and a single crystal silicon wafer, are disclosed. Single crystal silicon is produced by dipping a seed crystal in a melt and pulling the seed crystal up along the axis of the seed crystal, using a single crystal (1) in which the <110> crystal orientation (10) is inclined at a predetermined angle  $\theta$  with respect to the axial direction (9) so that the edge direction (8) of the {111} crystal plane is inclined with respect to the axial

direction (9). When single crystal silicon is grown while pulling up a seed crystal by the CZ method, a single crystal silicon ingot of a large diameter and a heavy weight can be pulled up by eliminating slip dislocations from the thick crystal.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 2005:264530 USPATFULL

TI Single crystal silicon producing method, single crystal silicon wafer producing method, seed crystal for producing single crystal silicon, single crystal silicon ingot, and single crystal silicon wafer

IN Iida, Tetsuhiro, Hiratsuka-shi, JAPAN  
Shiraishi, Yutaka, Hiratsuka-shi, JAPAN

Suewaka, Ryota, Hiratsuka-shi, JAPAN

Tomioka, Junsuke, Hiratsuka-shi, JAPAN

PI US 2005229840 A1 20051020

AI US 2003-512022 A1 20030417 (10)  
WO 2003-JP4868 20030417

20041019 PCT 371 date

PRAI JP 2002-118281 20020419

DT Utility

FS APPLICATION

LREP WELSH & KATZ, LTD, 120 S RIVERSIDE PLAZA, 22ND FLOOR, CHICAGO, IL, 60606, US

CLMN Number of Claims: 16

ECL Exemplary Claim: 1

DRWN 8 Drawing Page(s)

LN.CNT 872

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L8 ANSWER 3 OF 4 INPADOC COPYRIGHT 2006 EPO on STN

LEVEL 1

AN 285392023 INPADOC ED 20051103 EW 200544 UP 20051206 UW 200548

TI Single crystal silicon producing method, single crystal silicon wafer producing method, seed crystal for producing single crystal silicon, single crystal silicon ingot, and single crystal silicon wafer.

IN IIDA TETSUHIRO; SHIRAISHI YUTAKA; SUEWAKA RYOTA; TOMIOKA JUNSUKA

INS IIDA TETSUHIRO; SHIRAISHI YUTAKA; SUEWAKA RYOTA; TOMIOKA JUNSUKA

INA JP; JP; JP

PAS IIDA TETSUHIRO; SHIRAISHI YUTAKA; SUEWAKA RYOTA; TOMIOKA JUNSUKA

PAA JP; JP; JP

TL English

LA English

DT Patent

PIT USAA PATENT APPLICATION (PUBLICATION PRE-GRANT)

PI US 2005229840 A1 20051020

AI US 2004-512022 A 20041019

PRAI JP 2002-118281 A 20020419 (EDPR 20031114)  
WO 2003-JP4868 W 20030417 (EDPR 20050120)

L8 ANSWER 4 OF 4 INPADOC COPYRIGHT 2006 EPO on STN

LEVEL 1

AN 220071303 INPADOC ED 20031114 EW 200346 UP 20050707 UW 200527

TI SINGLE CRYSTAL SILICON PRODUCING METHOD,  
SINGLE CRYSTAL SILICON WAFER PRODUCING  
METHOD, SEED CRYSTAL FOR PRODUCING SINGLE

CRYSTAL SILICON, SINGLE CRYSTAL  
SILICON INGOT, AND SINGLE CRYSTAL  
SILICON WAFER.

PROCEDE DE PRODUCTION DE SILICIUM MONOCRISTALLIN, PROCEDE DE PRODUCTION  
DE TRANCHES DE SILICIUM MONOCRISTALLIN, CRISTAL GERME DESTINE A LA  
PRODUCTION DE SILICIUM MONOCRISTALLIN, LINGOT DE SILICIUM MONOCRISTALLIN,  
ET TRANCHE DE SILICIUM MONOCRISTALLIN.

IN IIDA, TETSUHIRO; SHIRAISHI, YUTAKA; SUEWAKA, RYOTA; TOMIOKA, JUNSUKE  
INS IIDA TETSUHIRO; SHIRAISHI YUTAKA; SUEWAKA RYOTA; TOMIOKA JUNSUKE  
INA JP; JP; JP; JP  
PA KOMATSU DENSHI KINZOKU KABUSHIKI KAISHA; IIDA, TETSUHIRO; SHIRAISHI,  
YUTAKA; SUEWAKA, RYOTA; TOMIOKA, JUNSUKE  
PAS KOMATSU DENSHI KINZOKU KABUSHI; IIDA TETSUHIRO; SHIRAISHI YUTAKA; SUEWAKA  
RYOTA; TOMIOKA JUNSUKE  
PAA JP; JP; JP; JP  
TL English; French  
LA Japanese  
DT Patent  
PIT WOAI PUBL.OF THE INT.APPL. WITH INT.SEARCH REPORT  
PI WO 2003089697 A1 20031030  
DS RW: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE  
SI SK TR  
W: KR SG US  
AI WO 2003-JP4868 A 20030417  
PRAI JP 2002-118281 A 20020419 (EDPR 20031114)

=> d his

(FILE 'HOME' ENTERED AT 07:07:40 ON 03 AUG 2006)

FILE 'HCAPLUS, INSPEC, JAPIO, USPATFULL, USPAT2, INPADOC' ENTERED AT  
07:07:55 ON 03 AUG 2006

L1 522833 S (SINGLE OR MONO) (8A) (CRYSTAL#)  
L2 2521855 S (SI OR SILICON)  
L4 1000573 S (AXIAL OR AXIAL(8A) DIRECTION)  
L5 655 S (INCLIN?) (8A) (CRYSTAL(6A) ORIENTAT?)  
L6 44213 S (CZ OR CZOCHRALSKI)  
L7 2691 S (110) (10A) (CRYSTAL(4A) ORIENTAT?)  
L8 4 S L1 AND L2 AND L4 AND L5 AND L6 AND L7

=>

Day : Thursday

Date: 8/3/2006  
Time: 06:56:33**PALM INTRANET****Inventor Name Search Result**

Your Search was:

Last Name = IIDA

First Name = TETSUHIRO

Application#	Patent#	Status	Date Filed	Title	Inventor Name
<a href="#">08680522</a>	<a href="#">5824152</a>	150	07/09/1996	SEMICONDUCTOR SINGLE-CRYSTAL PULLING APPARATUS	IIDA, TETSUHIRO
<a href="#">08829412</a>	<a href="#">5968260</a>	150	03/31/1997	METHOD FOR FABRICATING A SINGLE CRYSTAL SEMICONDUCTOR	IIDA, TETSUHIRO
<a href="#">09297678</a>	<a href="#">6228167</a>	150	05/09/1999	SINGLE CRYSTAL PULLING APPARATUS	IIDA, TETSUHIRO
<a href="#">10512022</a>	Not Issued	30	10/19/2004	Single crystal silicon producing method, single crystal silicon wafer producing method, seed crystal for producing single crystal silicon, single crystal silicon ingot, and single crystal silicon wafer	IIDA, TETSUHIRO

Inventor Search Completed: No Records to Display.

Search Another: Inventor	<b>Last Name</b>	<b>First Name</b>
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	<input type="button" value="Search"/>	

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Day : Thursday

Date: 8/3/2006

Time: 06:56:54

**PALM INTRANET****Inventor Name Search Result**

Your Search was:

Last Name = SHIRAISHI

First Name = YUTAKA

Application#	Patent#	Status	Date Filed	Title	Inventor Name
<a href="#"><u>08039206</u></a>	<a href="#"><u>5427056</u></a>	150	04/06/1993	APPARATUS AND METHOD FOR PRODUCING SINGLE CRYSTAL	SHIRAISHI, YUTAKA
<a href="#"><u>08135563</u></a>	<a href="#"><u>5450814</u></a>	150	10/14/1993	SINGLE CRYSTAL PULLING APPARATUS HAVING SLIDABLE SHIELD PLATE TO CONTROL AREA OF OPENING AROUND SINGLE CRYSTAL	SHIRAISHI, YUTAKA
<a href="#"><u>08214470</u></a>	Not Issued	166	03/18/1994	CONTROL OF OXYGEN CONCENTRATION IN SINGLE CRYSTAL PULLED UP FROM MELT CONTAINING GROUP-V ELEMENT	SHIRAISHI, YUTAKA
<a href="#"><u>08291833</u></a>	<a href="#"><u>5524574</u></a>	150	08/17/1994	CONTROL OF OXYGEN CONCENTRATION IN SINGLE CRYSTAL PULLED UP FROM MELT CONTAINING GROUP-V ELEMENT	SHIRAISHI, YUTAKA
<a href="#"><u>08399558</u></a>	<a href="#"><u>5488923</u></a>	150	03/07/1995	METHOD FOR PRODUCING SINGLE CRYSTAL	SHIRAISHI, YUTAKA
<a href="#"><u>08561835</u></a>	<a href="#"><u>5942169</u></a>	250	11/27/1995	OPTIMIZATION OF OVER-MOLDING METHOD FOR THREE-DIMENSIONAL HOLLOW MOLDED ARTICLE	SHIRAISHI, YUTAKA
<a href="#"><u>08649266</u></a>	<a href="#"><u>5660629</u></a>	150	05/17/1996	APPARATUS FOR DETECTING THE DIAMETER OF A SINGLE CRYSTAL SILICON	SHIRAISHI, YUTAKA
<a href="#"><u>08743046</u></a>	<a href="#"><u>5681758</u></a>	250	11/04/1996	METHOD FOR FABRICATING SEMICONDUCTOR SINGLE CRYSTAL	SHIRAISHI, YUTAKA
<a href="#"><u>09037515</u></a>	<a href="#"><u>6033472</u></a>	150	03/10/1998	SEMICONDUCTOR SINGLE CRYSTAL MANUFACTURING	SHIRAISHI, YUTAKA

APPARATUS					
<u>09037516</u>	6077348	150	03/10/1998	SINGLE CRYSTAL PULLING APPARATUS, SINGLE CRYSTAL SUPPORT MECHANISM, AND SINGLE CRYSTAL PULLING METHOD	SHIRAISHI, YUTAKA
<u>09079233</u>	Not Issued	161	05/15/1998	OVER-MOLDING METHOD FOR A THREE-DIMENSIONAL HOLLOW MOLDED ARTICLE AND OPTIMIZATION OF THE OVER-MOLDING METHOD FOR A THREE-DIMENSIONAL HOLLOW MOLDED ARTICLE	SHIRAISHI, YUTAKA
<u>09284834</u>	6217648	150	04/21/1999	SINGLE CRYSTAL PULLING APPARATUS AND SINGLE CRYSTAL PULLING METHOD	SHIRAISHI, YUTAKA
<u>09403621</u>	6361597	250	11/05/1999	SINGLE CRYSTAL MATERIAL AUXILIARY MELTING APPARATUS AND SINGLE CRYSTAL MATERIAL MELTING METHOD	SHIRAISHI, YUTAKA
<u>10487286</u>	Not Issued	90	02/20/2004	SINGLE CRYSTAL SEMICONDUCTOR MANUFACTURING APPARATUS AND MANUFACTURING METHOD, AND SINGLE CRYSTAL INGOT	SHIRAISHI, YUTAKA
<u>10512022</u> <i>Applicant's Inventor</i>	Not Issued	30	10/19/2004	Single crystal silicon producing method, single crystal silicon wafer producing method, seed crystal for producing single crystal silicon, single crystal silicon ingot, and single crystal silicon wafer	SHIRAISHI, YUTAKA

Inventor Search Completed: No Records to Display.

<b>Search Another: Inventor</b>	<b>Last Name</b>	<b>First Name</b>
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Day : Thursday

Date: 8/3/2006  
Time: 06:57:08**PALM INTRANET****Inventor Name Search Result**

Your Search was:

Last Name = SUEWAKA

First Name = RYOTA

Application#	Patent#	Status	Date Filed	Title	Inventor Name
10512022	Not Issued	30	10/19/2004	Single crystal silicon producing method, single crystal silicon wafer producing method, seed crystal for producing single crystal silicon, single crystal silicon ingot, and single crystal silicon wafer	SUEWAKA, RYOTA

Inventor Search Completed: No Records to Display.

Search Another: Inventor

Last Name	First Name
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<input type="button" value="Search"/>	

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Day : Thursday

Date: 8/3/2006

Time: 06:57:23

**PALM INTRANET****Inventor Name Search Result**

Your Search was:

Last Name = TOMIOKA

First Name = JUNSUKE

Application#	Patent#	Status	Date Filed	Title	Inventor Name
07772928	5316742	150	10/08/1991	SINGLE CRYSTAL PULLING APPARATUS	TOMIOKA, JUNSUKE
08030356	5385115	150	03/17/1993	SEMICONDUCTOR WAFER HEAT TREATMENT METHOD	TOMIOKA, JUNSUKE
08170175	5441014	150	12/22/1993	APPARATUS FOR PULLING UP A SINGLE CRYSTAL	TOMIOKA, JUNSUKE
08829412	5968260	150	03/31/1997	METHOD FOR FABRICATING A SINGLE CRYSTAL SEMICONDUCTOR	TOMIOKA, JUNSUKE
08861658	Not Issued	164	05/22/1997	A METHOD OF FABRICATING A SEMICONDUCTOR SINGLE CRYSTAL AND A SINGLE CRYSTAL MATERIAL FABRICATED BY THE METHOD	TOMIOKA, JUNSUKE
08941309	6007625	150	09/30/1997	APPARATUS FOR MANUFACTURING SINGLE CRYSTAL	TOMIOKA, JUNSUKE
08956434	5938836	150	10/23/1997	APPARATUS AND METHOD FOR MANUFACTURING SEMICONDUCTOR SINGLE CRYSTALS	TOMIOKA, JUNSUKE
08976340	5968262	150	11/21/1997	METHOD OF FABRICATING SILICON SINGLE CRYSTALS	TOMIOKA, JUNSUKE
08985248	Not Issued	161	12/04/1997	APPARATUS FOR MANUFACTURING SINGLE CRYSTAL SILICON AND METHOD OF MANUFACTURING THEREOF	TOMIOKA, JUNSUKE
09014048	6056931	150	01/27/1998	SILICON WAFER FOR HYDROGEN HEAT TREATMENT AND METHOD	TOMIOKA, JUNSUKE

				FOR MANUFACTURING THE SAME	
09015132	5885347	150	01/29/1998	APPARATUS AND METHOD FOR LIFTING SINGLE CRYSTALS	TOMIOKA, JUNSUKE
09025570	Not Issued	161	02/18/1998	MANUFACTURING METHOD OF A SILICON WAFER AND THE SILICON WAFER	TOMIOKA, JUNSUKE
09048302	5942033	150	03/26/1998	APPARATUS AND METHOD FOR PULLING UP SINGLE CRYSTALS	TOMIOKA, JUNSUKE
09088657	6099642	150	06/02/1998	APPARATUS FOR PULLING UP SINGLE CRYSTALS AND SINGLE CRYSTAL CLAMPING DEVICE	TOMIOKA, JUNSUKE
09121858	6042644	150	07/24/1998	SINGLE CRYSTAL PULLING METHOD	TOMIOKA, JUNSUKE
09160426	Not Issued	161	09/24/1998	SEED-CRYSTAL HOLDING DEVICE USED IN A SINGLE-CRYSTAL MANUFACTURING APPARATUS AND METHOD FOR FABRICATING THE SAME	TOMIOKA, JUNSUKE
09251399	6171393	150	02/17/1999	SEED CRYSTAL AND METHOD OF MANUFACTURING SINGLE CRYSTAL	TOMIOKA, JUNSUKE
09336906	6270575	150	06/21/1999	APPARATUS AND A METHOD OF MANUFACTURING A CRYSTAL	TOMIOKA, JUNSUKE
09396107	6179910	150	09/14/1999	METHOD FOR MANUFACTURING SILICON SINGLE CRYSTAL AND WAFERS ADAPTED FOR PRODUCING SEMICONDUCTORS	TOMIOKA, JUNSUKE
09410723	6315827	150	09/30/1999	APPARATUS FOR PRODUCING SINGLE CRYSTAL	TOMIOKA, JUNSUKE
09422711	Not Issued	161	10/21/1999	METHOD FOR DETECTING THE INSERTION OF CLAMPING MEMBERS INTO THE SMALL-DIAMETER RECESS PORTION OF A SINGLE-CRYSTAL BODY AND DEVICE FOR LIFTING	TOMIOKA, JUNSUKE

SINGLE-CRYSTAL BODIES					
09425019	6179911	150	10/25/1999	METHOD FOR MANUFACTURING SINGLE CRYSTAL	TOMIOKA, JUNSUKE
09544556	6273944	150	04/06/2000	Silicon wafer for hydrogen heat treatment and method for manufacturing the same	TOMIOKA, JUNSUKE
10512022	Not Issued <i>Applicant Invention</i>	30 <i>+5)</i>	10/19/2004	Single crystal silicon producing method, single crystal silicon wafer producing method, seed crystal for producing single crystal silicon, single crystal silicon ingot, and single crystal silicon wafer	TOMIOKA, JUNSUKE

Inventor Search Completed: No Records to Display.

<b>Search Another: Inventor</b>	<b>Last Name</b>	<b>First Name</b>
	<input type="text" value="Tomioka"/>	<input type="text" value="Junsuke"/>
	<input type="button" value="Search"/>	

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